



Surviving An Amazon Outage

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Continuent

Overview

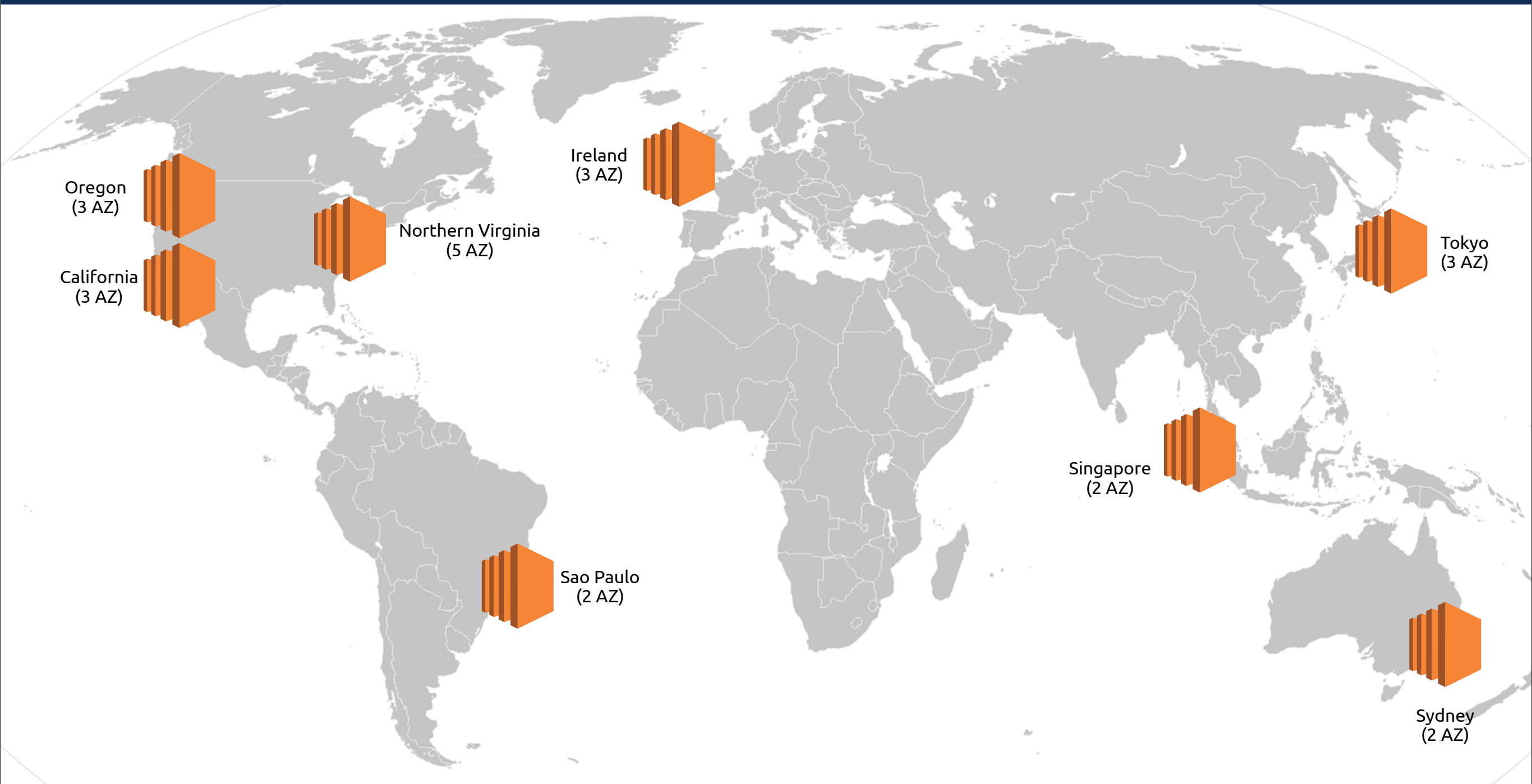
- Continuent's external/internal infrastructure is built in AWS
- Review carried out in the Summer of 2012 after several AWS Outages
- Treated the review as a Customer engagement
- Further review in Autumn of 2012 leading to the Multi-Cloud deployment

What is AWS

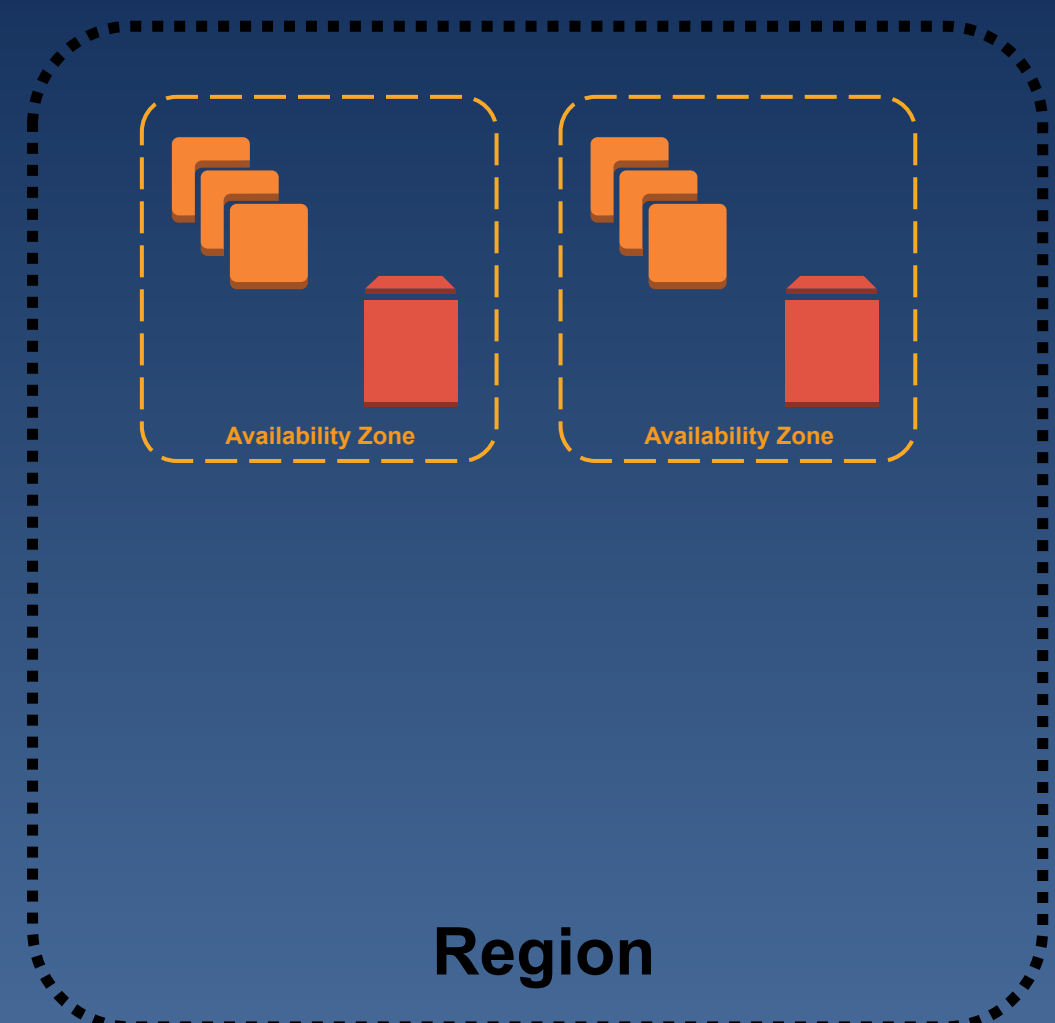
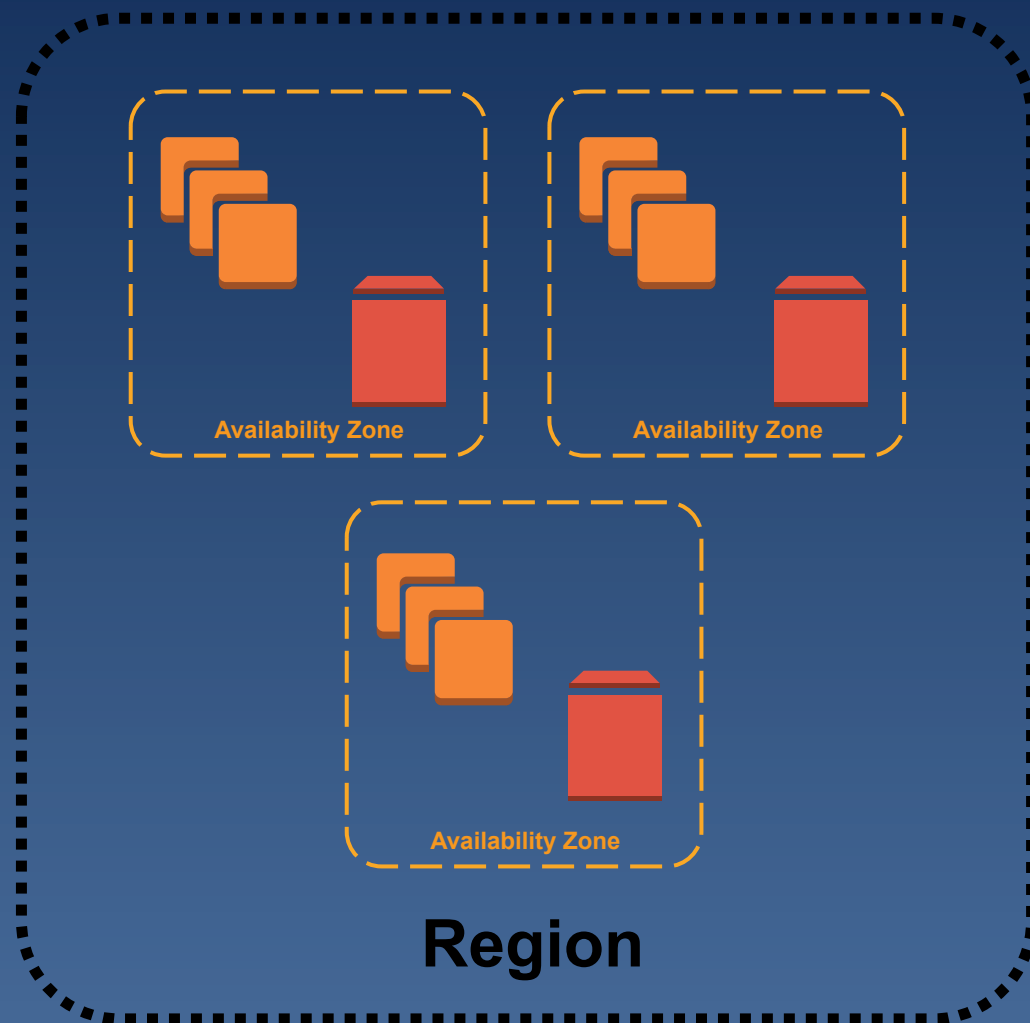
Amazon Web Services is a collection of remote computing services (also called web services) that together make up a cloud computing platform.

The central services are EC2 (Compute) and S3 (Storage) Services.

AWS Regions



AWS Availability Zones



AWS Services

- Compute EC2
- Network - Route 53 and Virtual Private Cloud (VPC)
- Content Delivery - Cloudfront
- Storage - S3, Glacier, EBS
- Database - DynamoDB, RDS, RedShift, SimpleDB
- Deployment - Cloudformation, Beanstalk, OpsWorks

AWS Size*

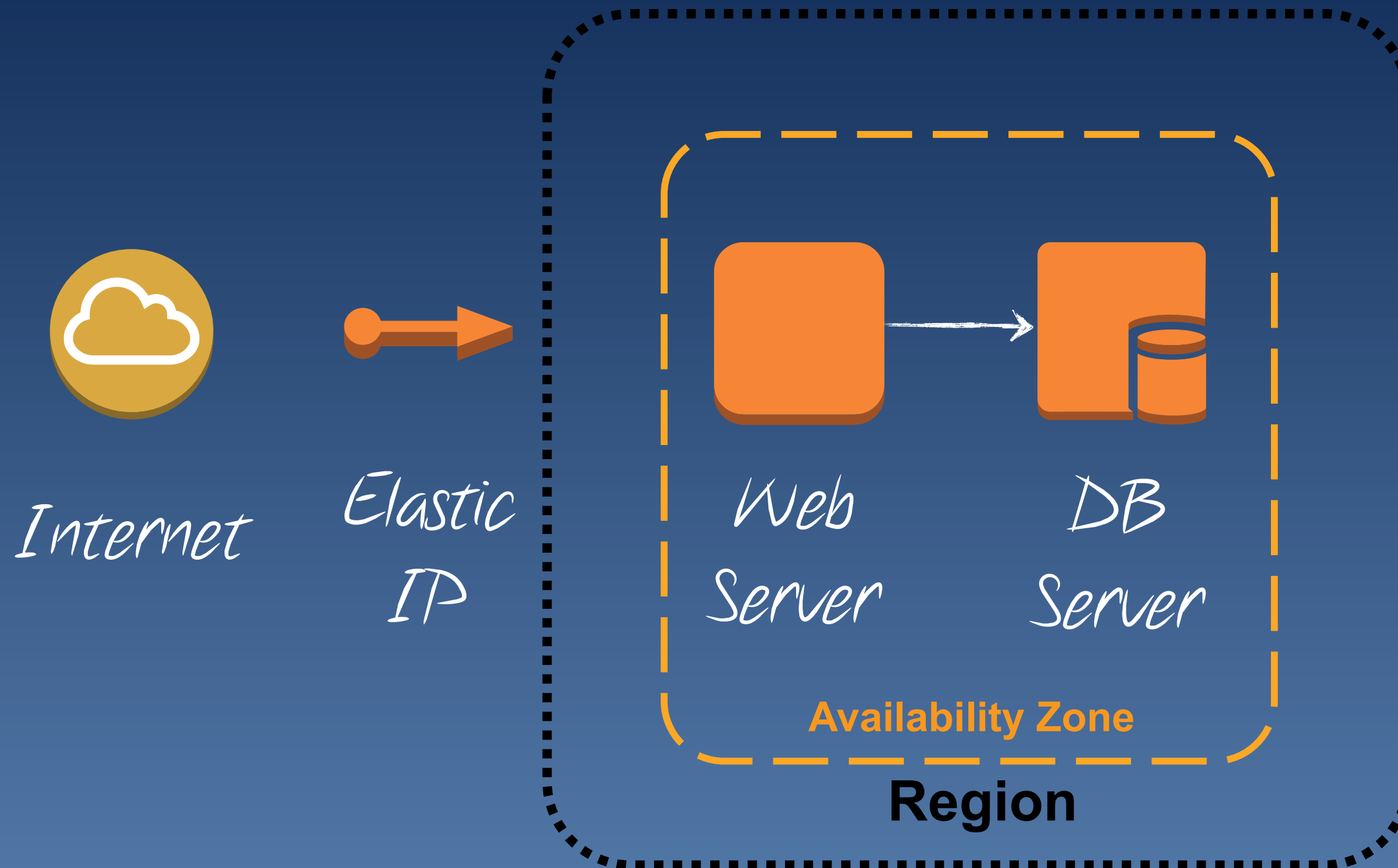
- Between 100K and 500K physical servers
- 1.5million Public IP Addresses
- S3 holds > 2 Trillion objects - 1.1m requests per second
- 1/3 of daily users access a site running on AWS
- 1% of internet traffic goes through Amazon Infrastructure

* Estimates based on various internet sources

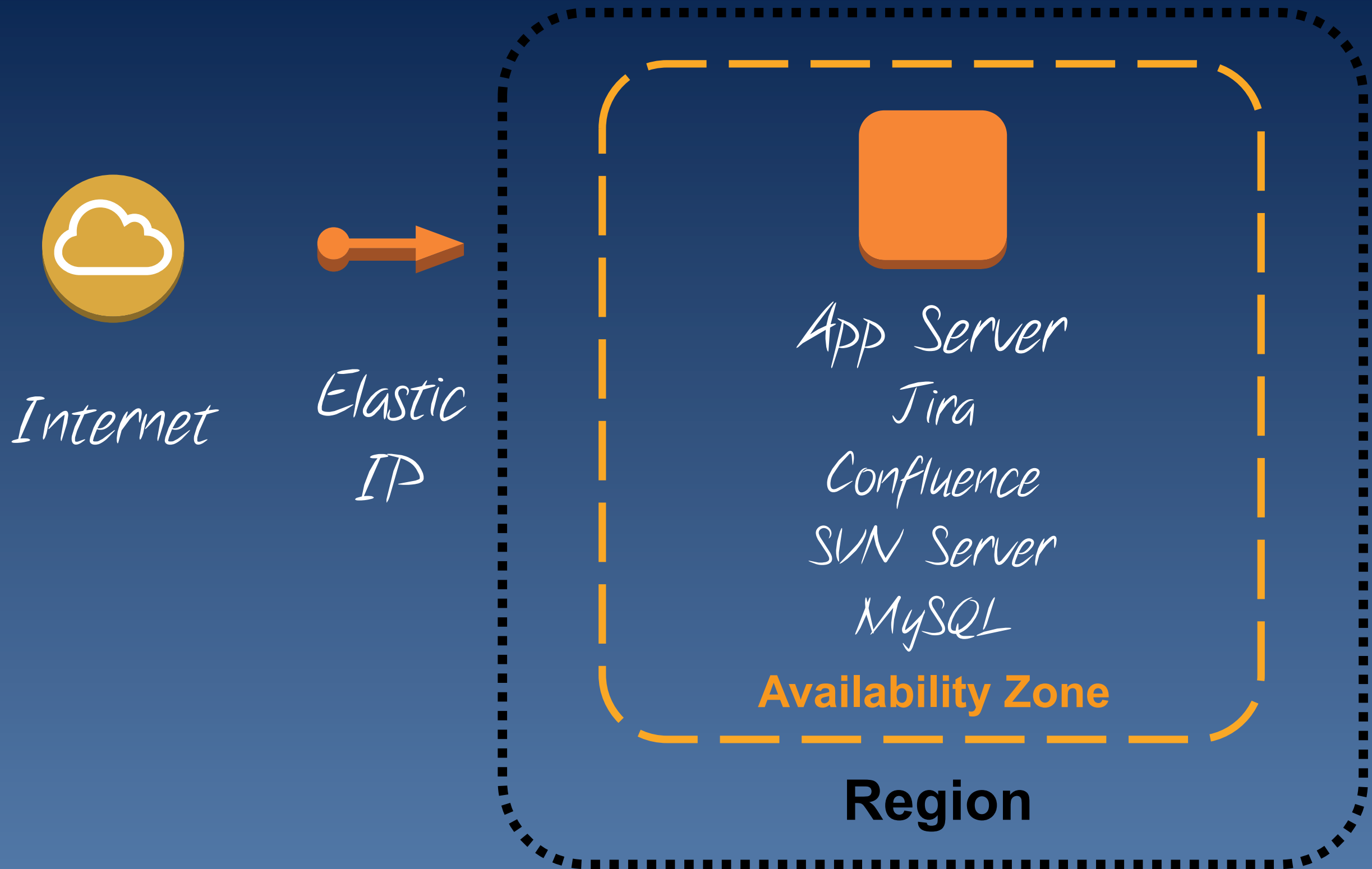
Continuent Systems

- External facing website
- Jira/Confluence internal systems
- Subversion
- Jenkins build system

External Website



Jira/Confluence/Subversion



AWS Problems Summer 2012

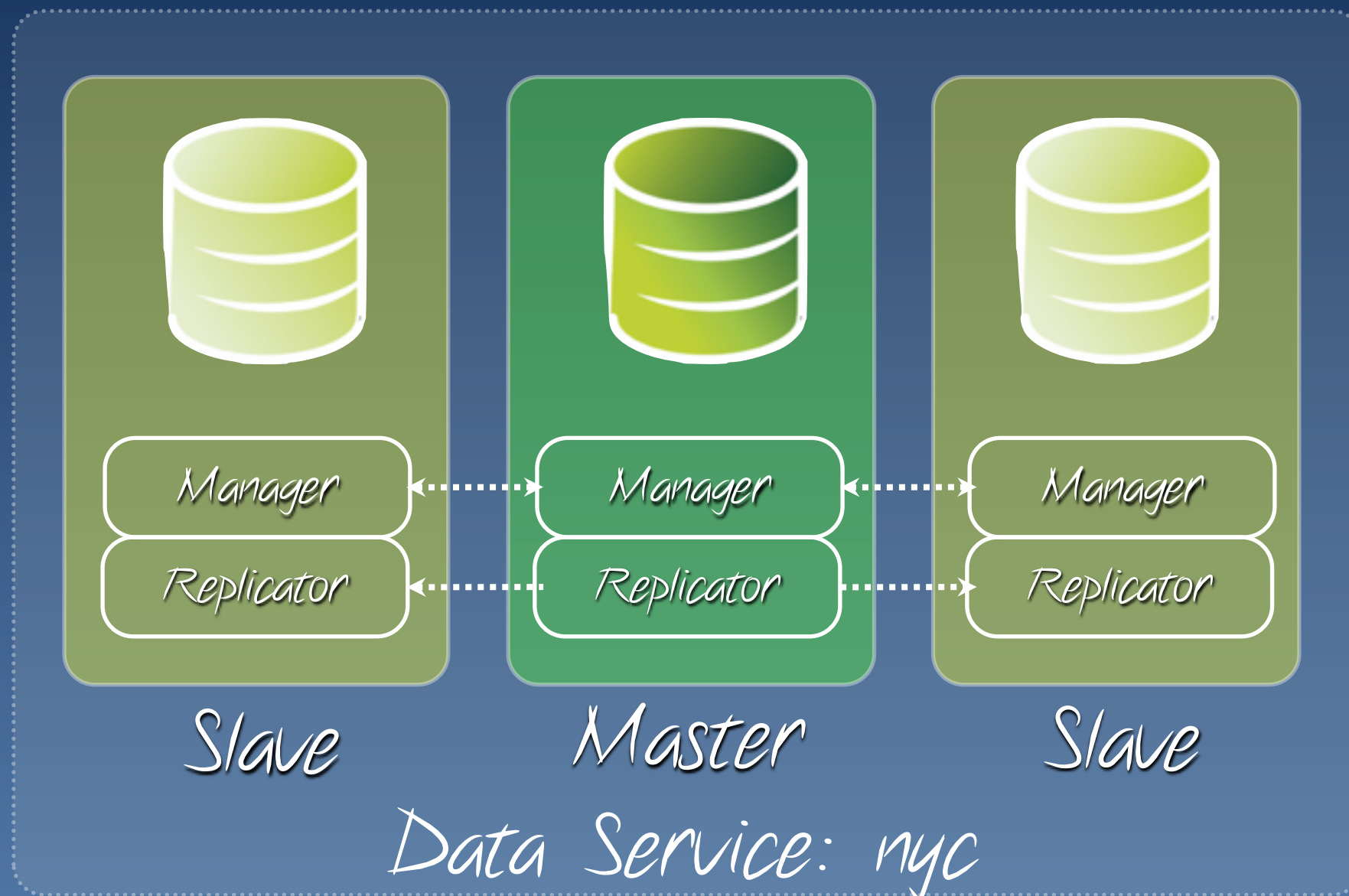
“Amazon Cloud Hit by Real Clouds, Downing Netflix, Instagram, Other Sites”

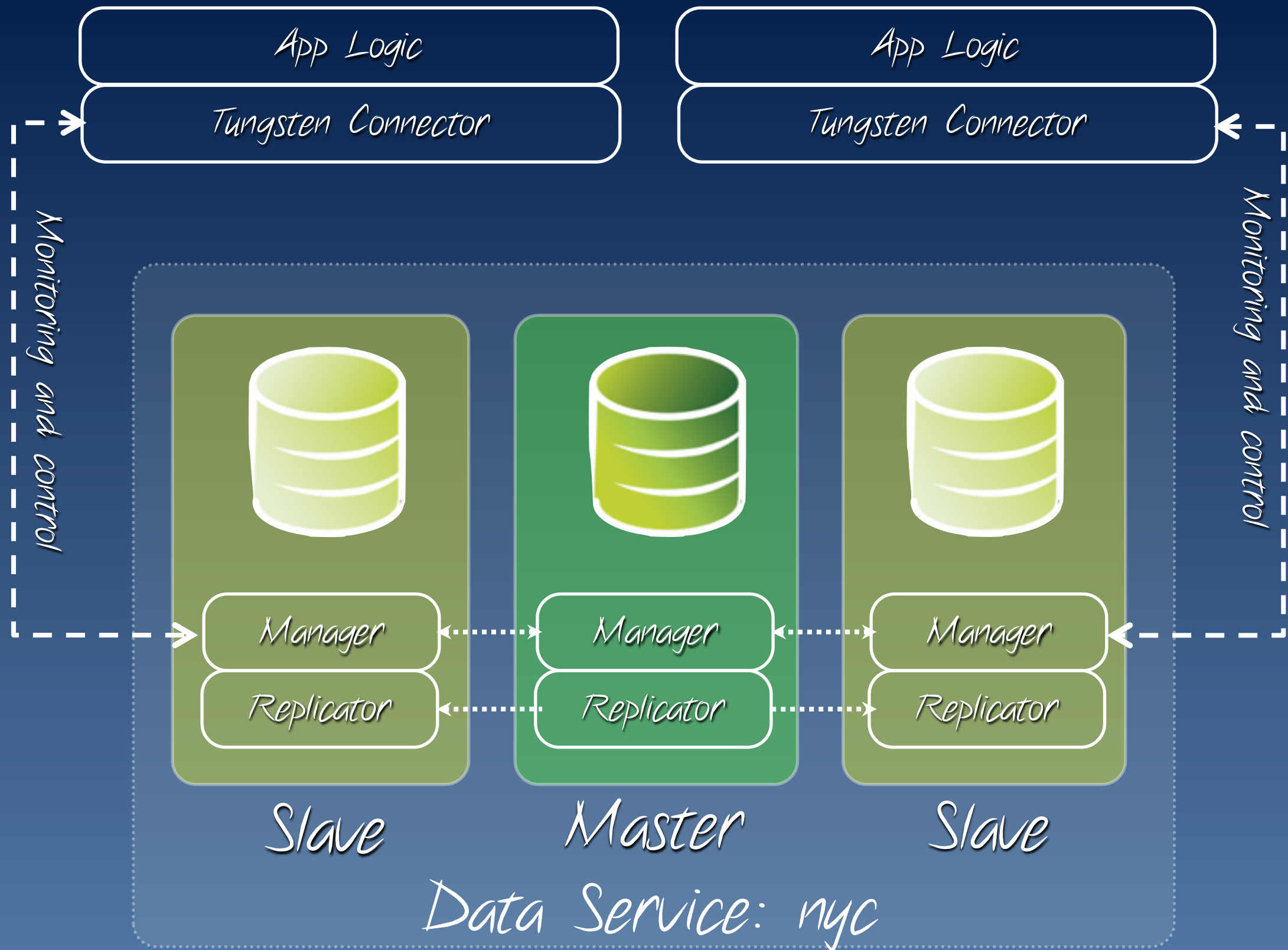
Severe Storms caused power outages at AWS US-East Data centers, generators failed taking out 7% of EC2 instances.

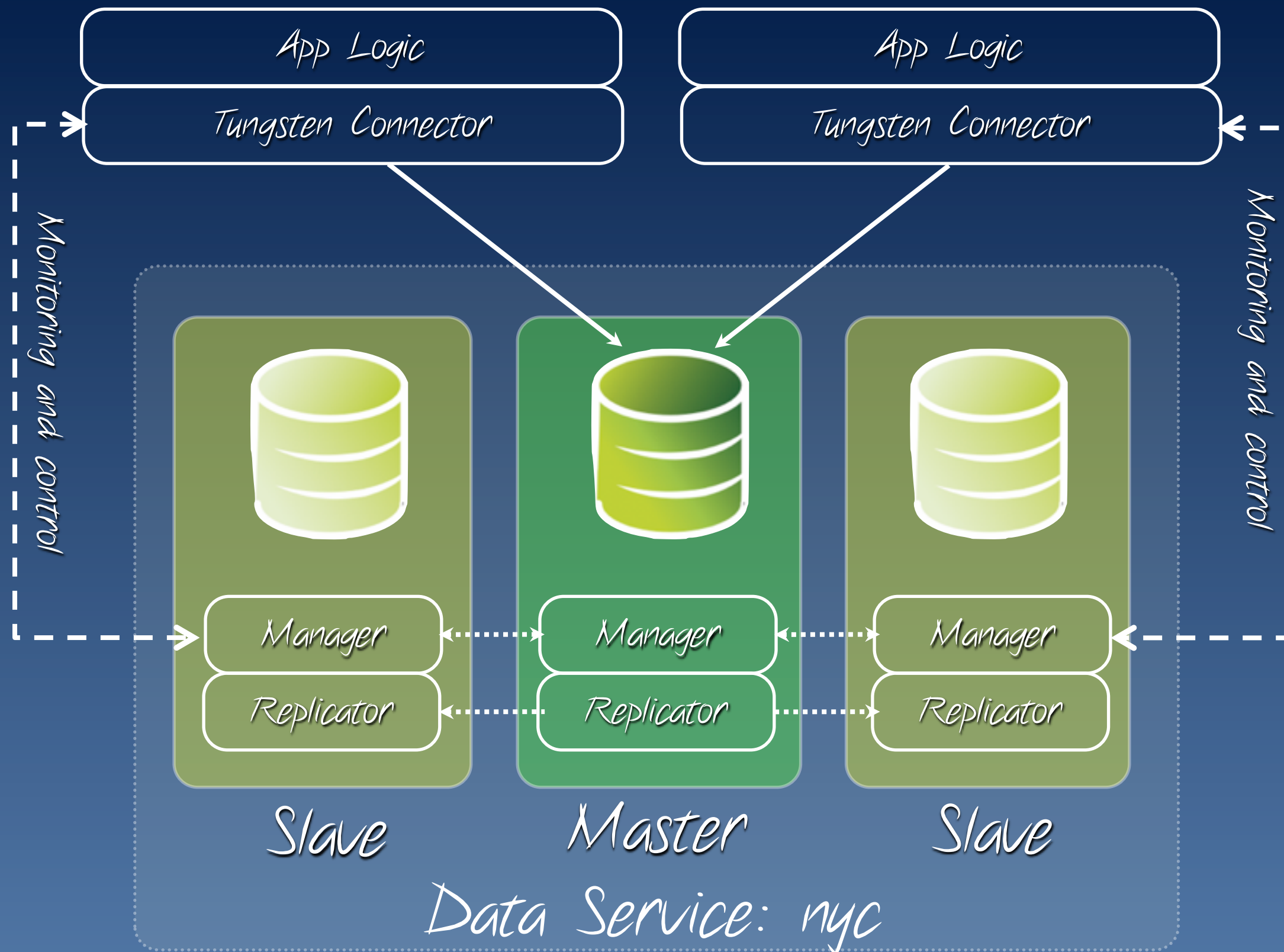
[http://www.pcworld.com/article/258627/
amazon cloud hit by real clouds knocking out popular sites like netflix instagram.html](http://www.pcworld.com/article/258627/amazon_cloud_hit_by_real_clouds_knocking_out_popular_sites_like_netflix_instagram.html)

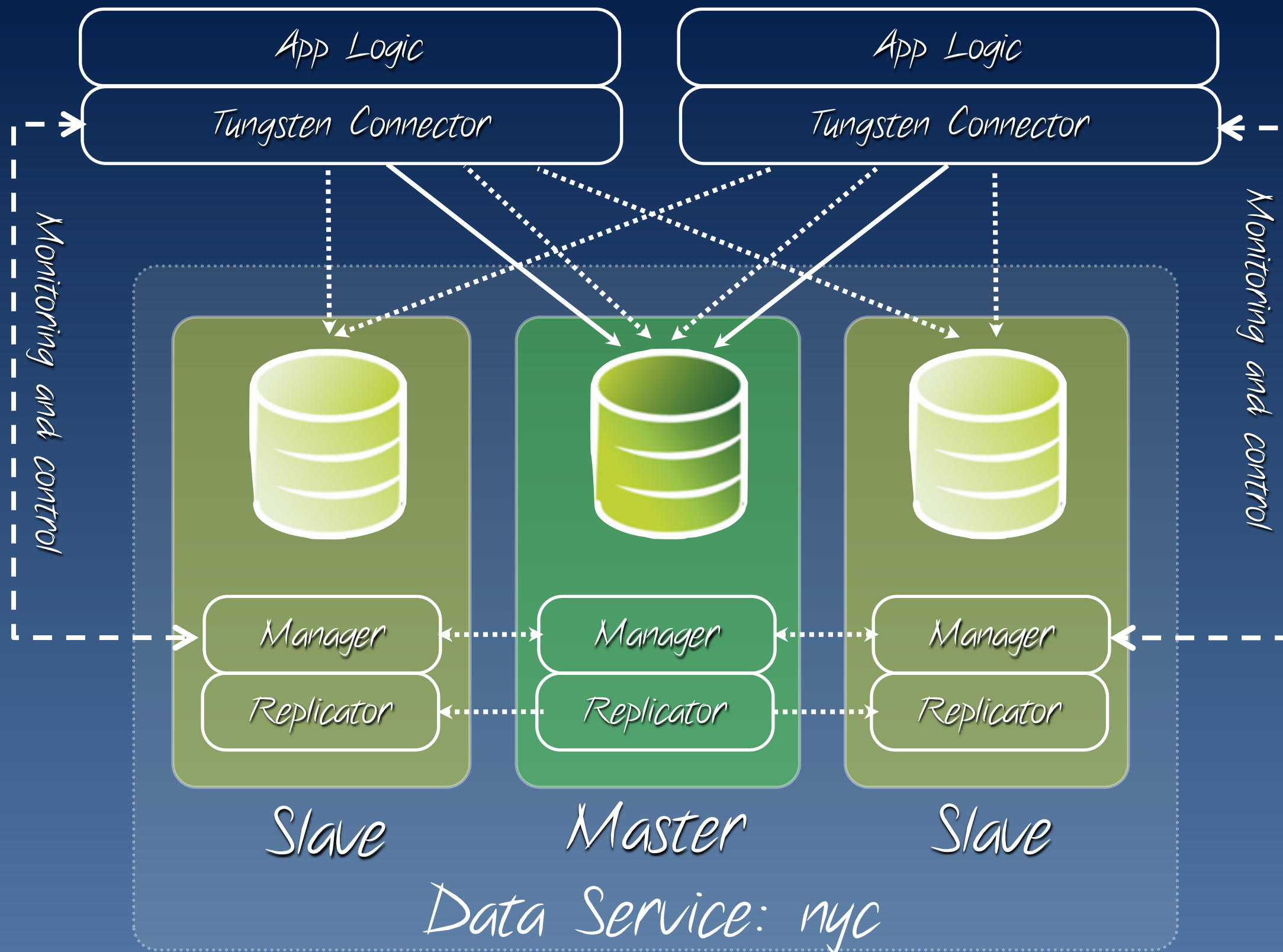
Migration Plan

- Move to a clustered Continuent Tungsten environment
- Ensure all components are replicated into at least one other AWS Region
- Limited downtime on Customer facing systems
- Minimal downtime on internal systems

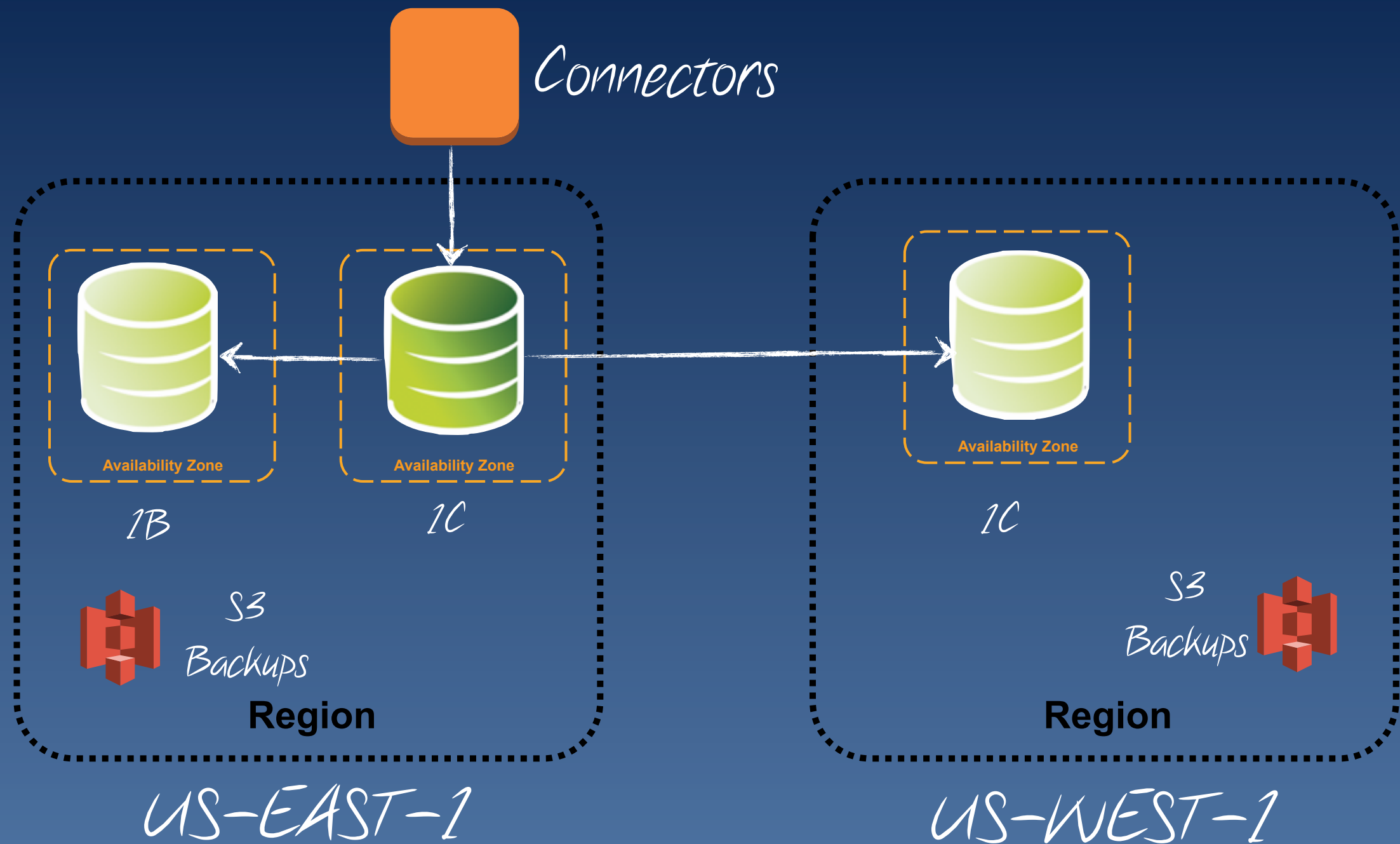




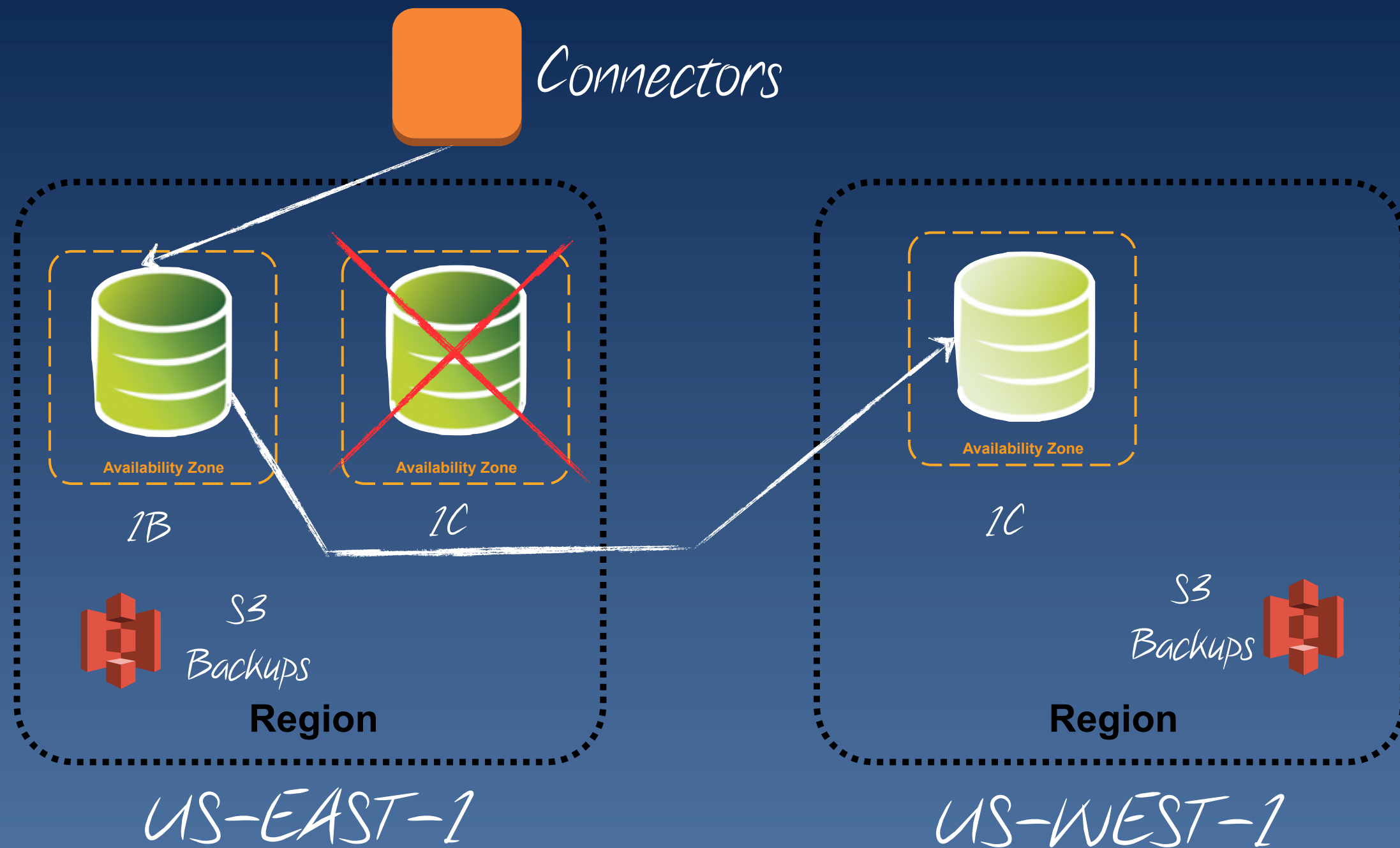




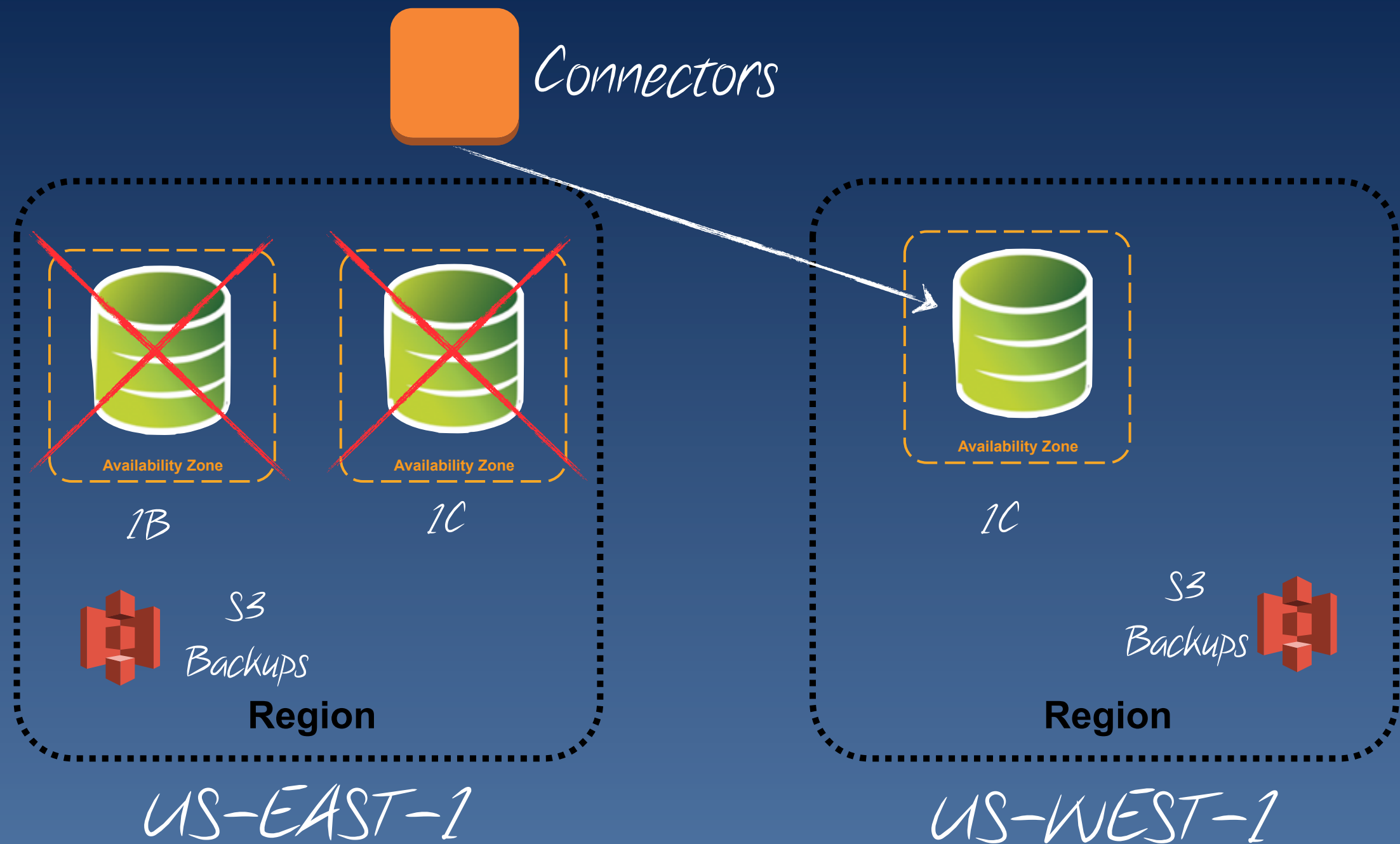
Website Database Tier - Round 1



DB Failures - Failure in US-EAST-1C

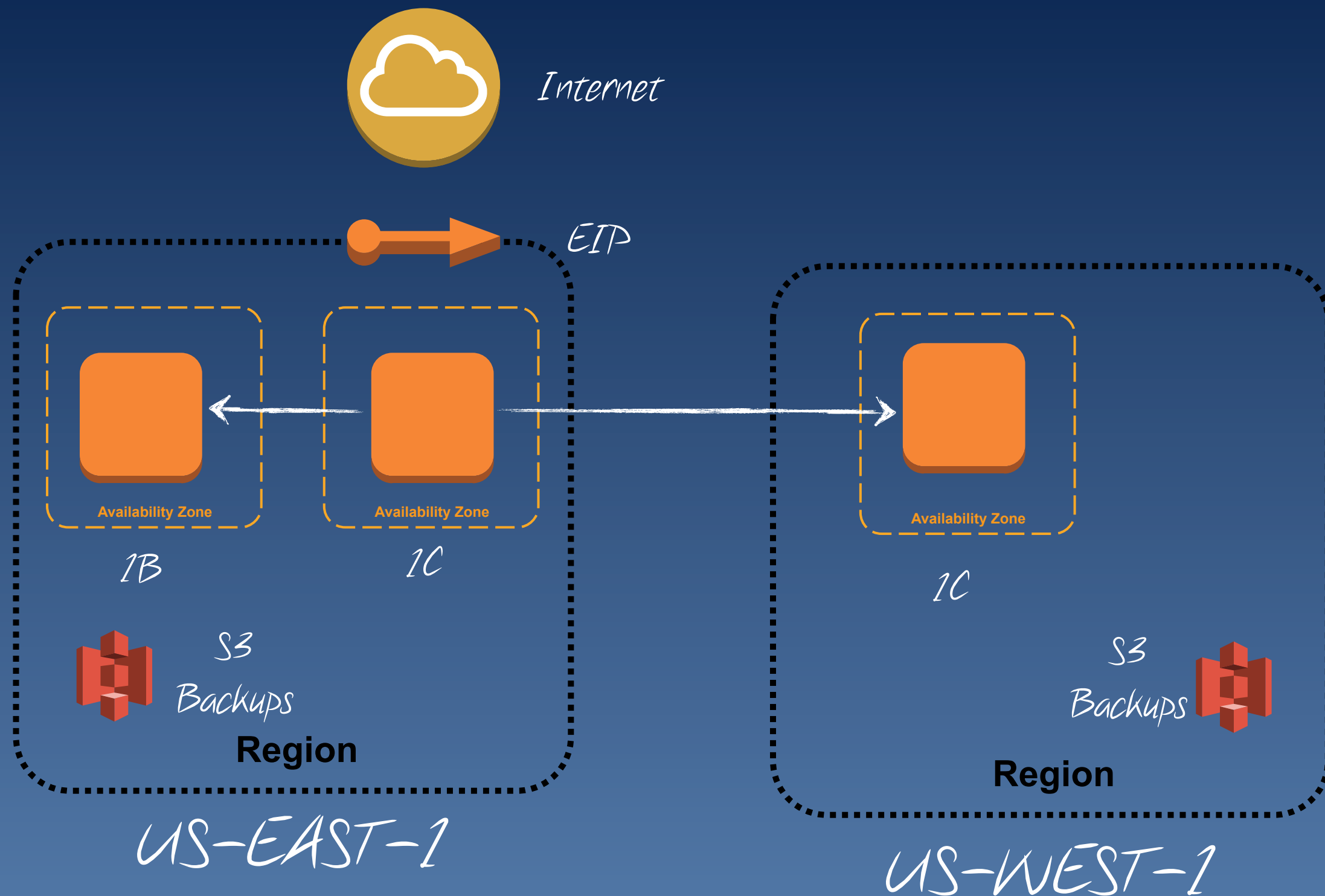


DB Failures - Failure in US-EAST

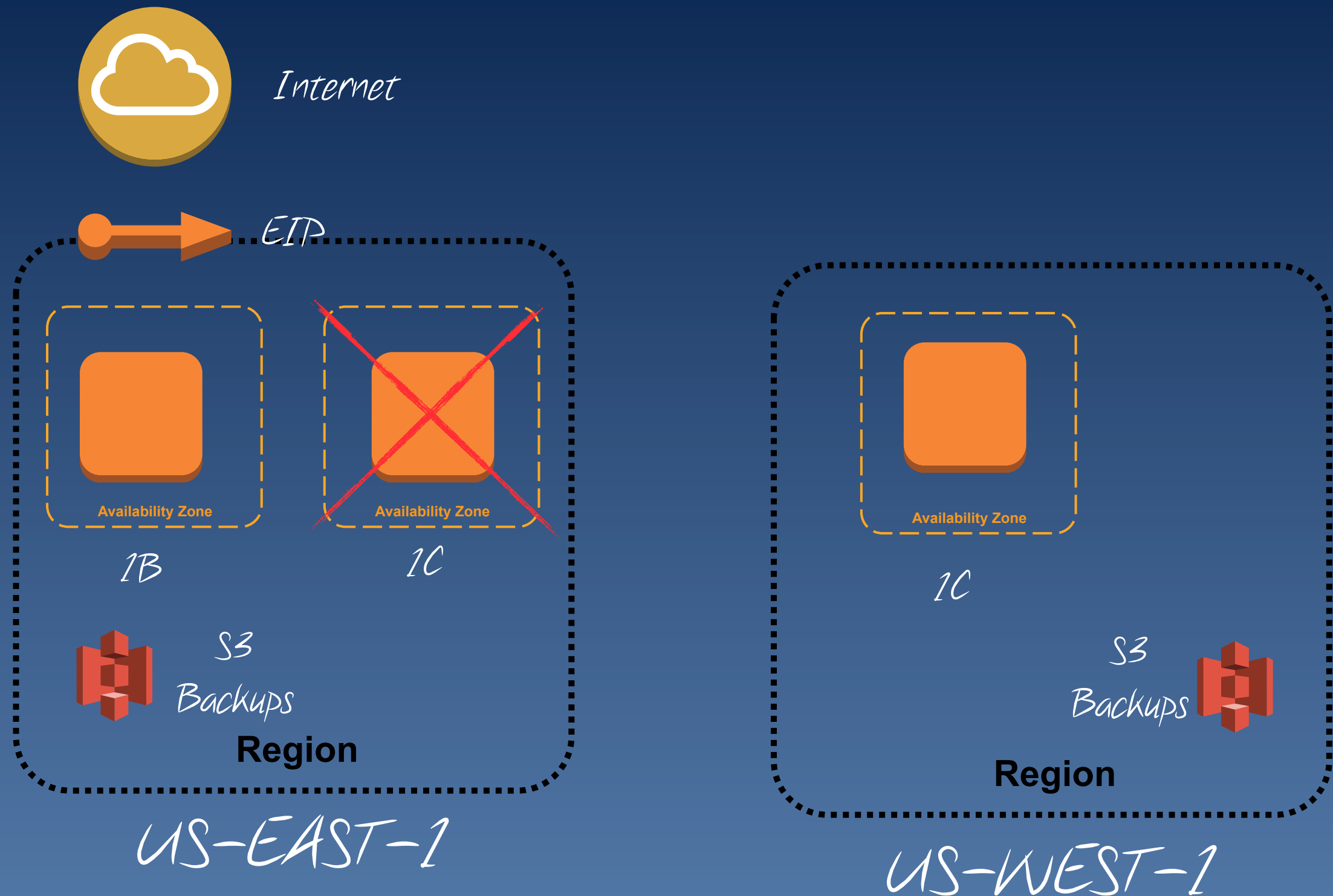


DEMO

Website Web Tier - Round 1



Web Failures - Failure in US-EAST-1C

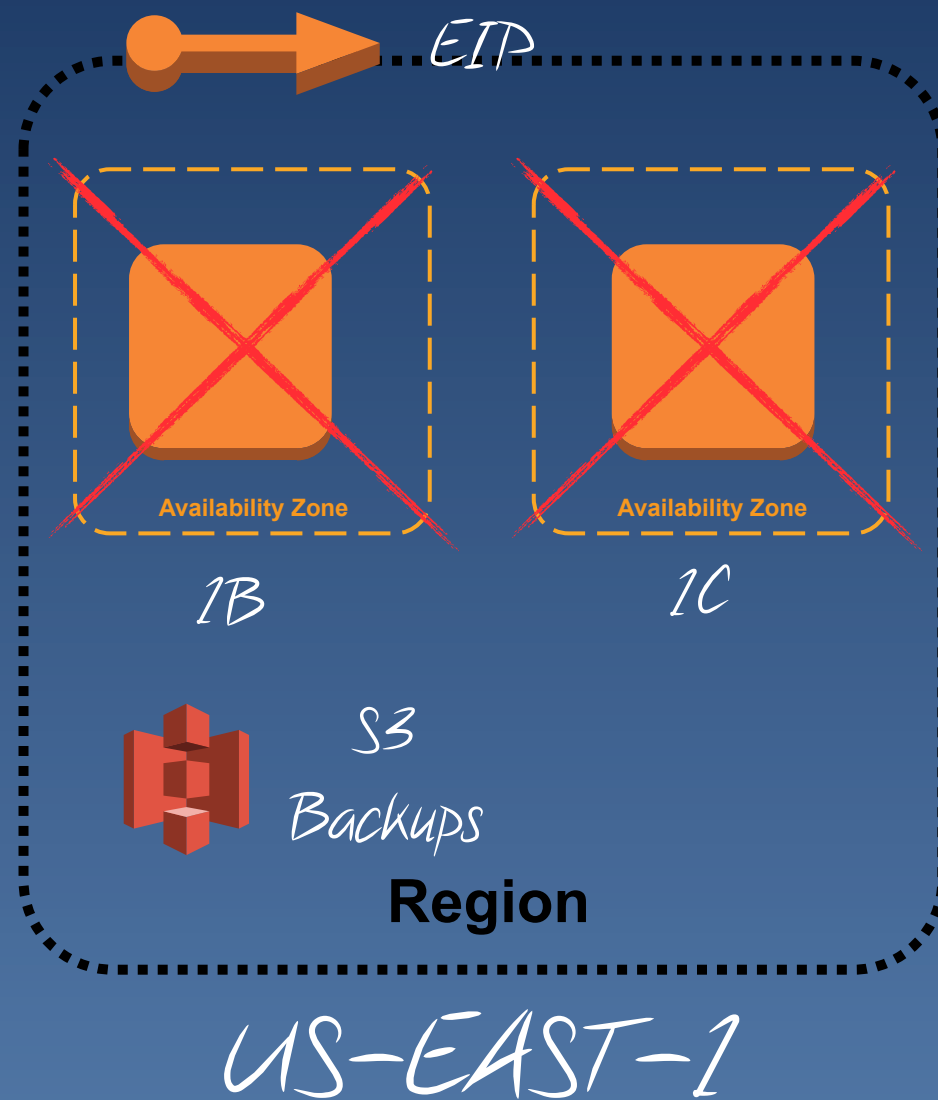


Web Failures - Failure in US-EAST

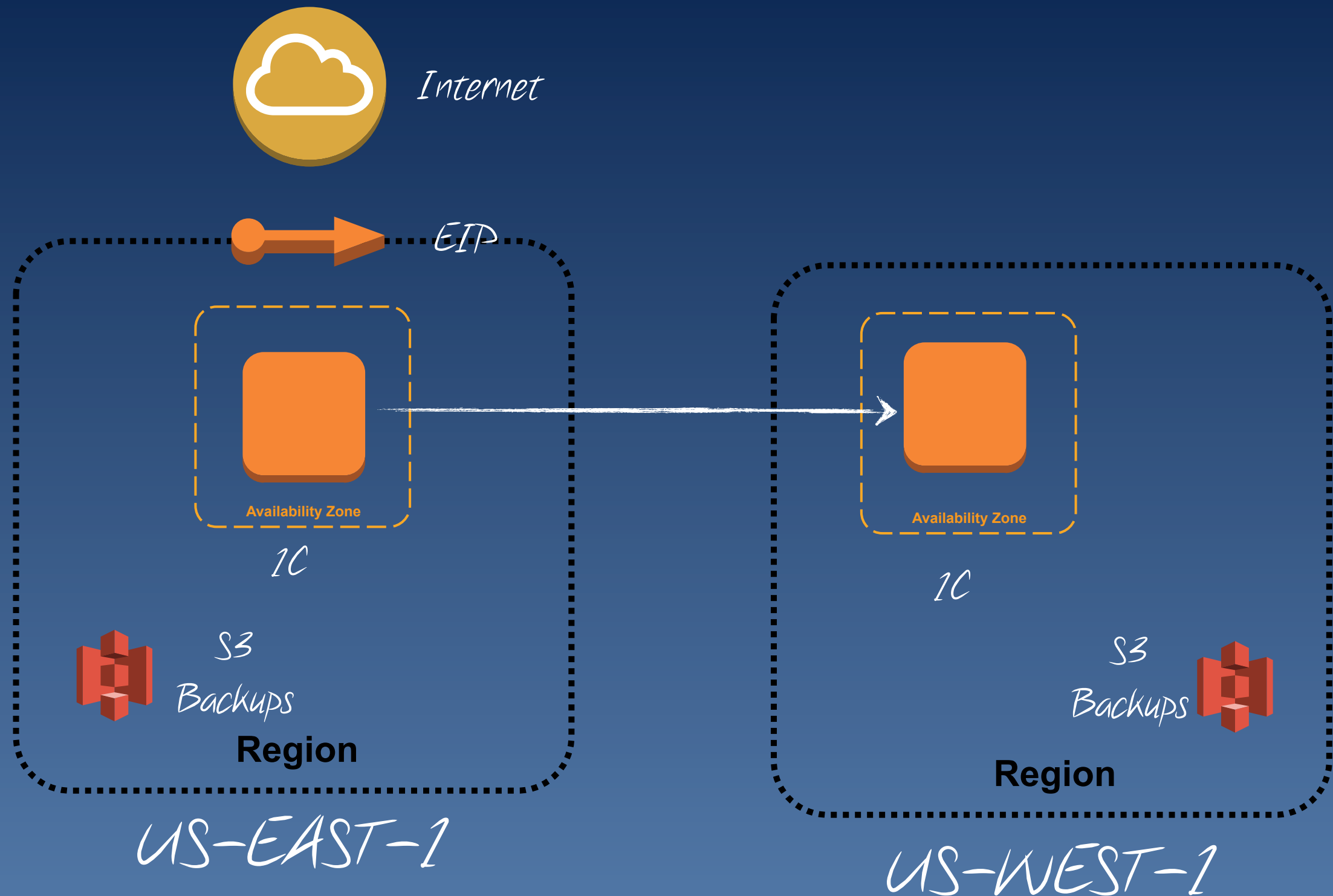
DNS Update



Internet



Jira/Confluence/SVN - Round 1



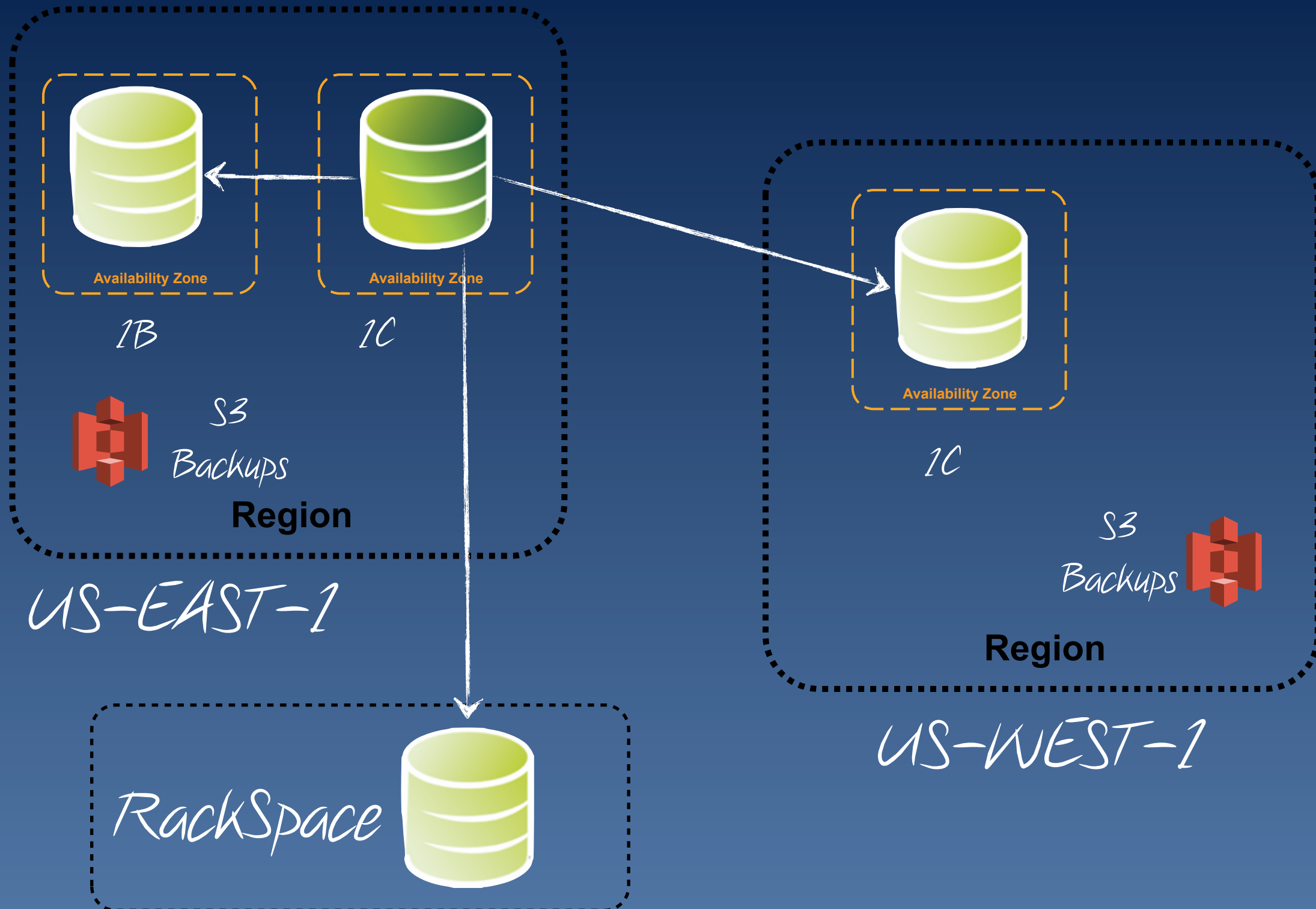
AWS Failures - Autumn 2012

“Amazon Web Services outage takes out popular websites again”

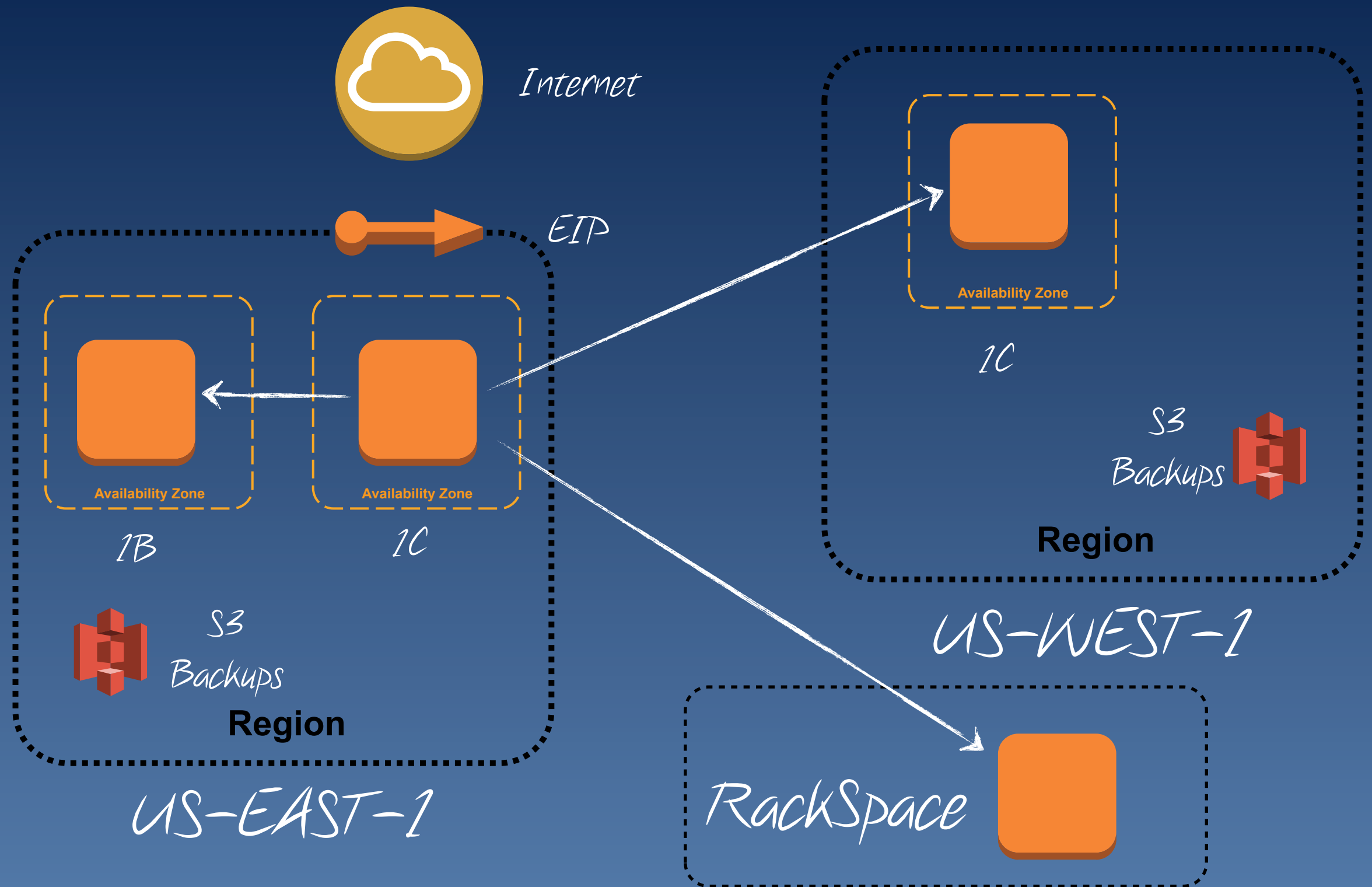
- EBS degraded performance
- Problems allocating new volumes

<http://www.pcworld.com/article/2012852/amazon-web-services-outage-takes-out-popular-websites-again.html>

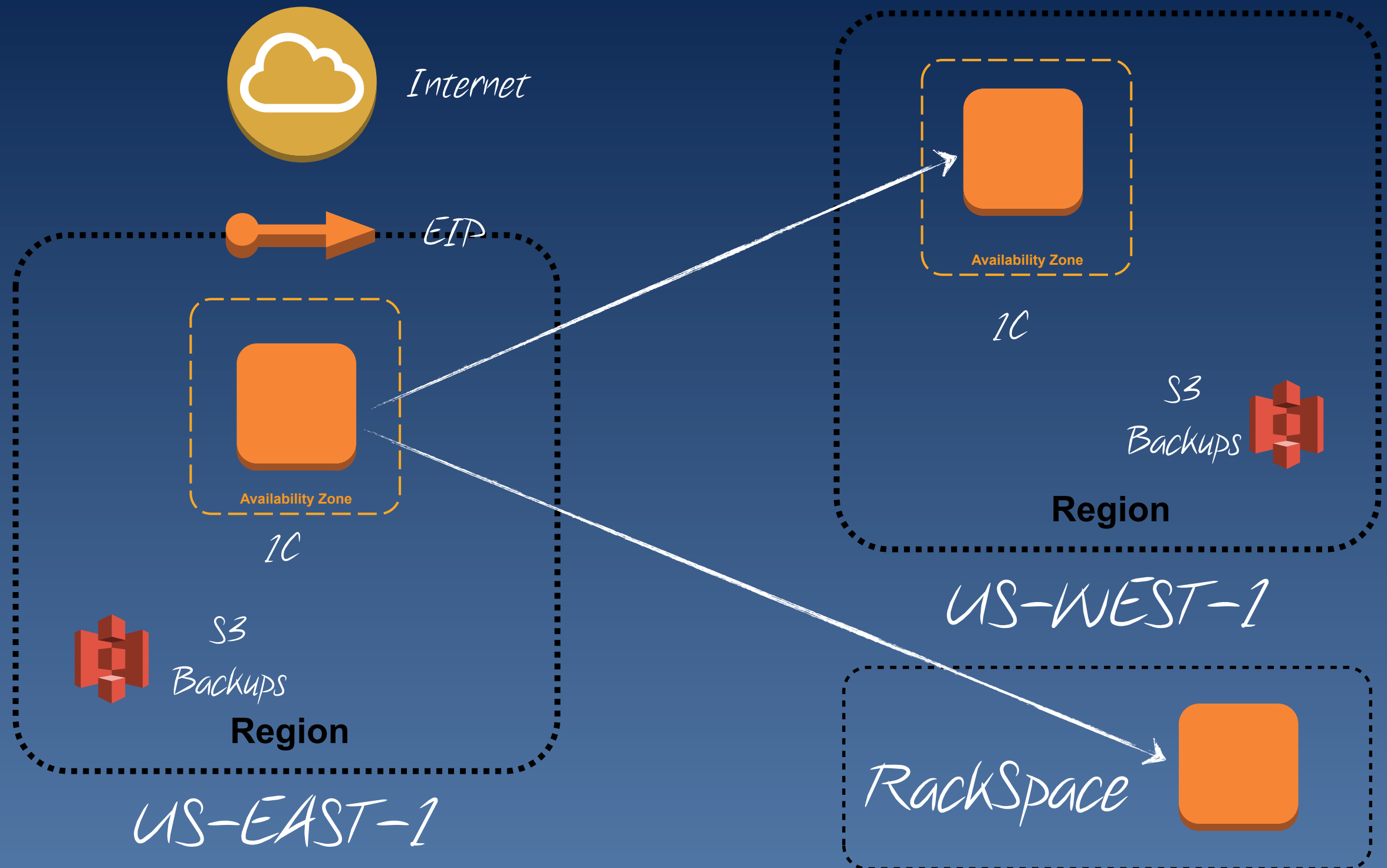
Website Database Tier - Round 2



Website Web Tier - Round 2



Jira/Confluence/SVN - Round 2



Best Practices

- RAID EBS Volumes (RAID1)
- Backups
 - xtrabackup (backed up into S3)
 - EBS Snapshot

```
ec2-consistent-snapshot \  
  --mysql --freeze-filesystem /vol \  
  --region eu-west-1 \  
  --description "$(hostname) RAID snapshot  
$(date +%Y-%m-%d %H:%M:%S)" \  
vol-1f9a6446 vol-649a643d
```

Best Practices

- Monitoring
 - Nagios scripts converted to email alerts
 - New Relic

Lesson Learnt

- EC2 Instances fail
- One of anything is never enough
- Don't assume you can spin up more resources instantly
- Think multi-cloud, public/private

Further Plans

- Realtime replication of web assets (glusterFS?)
- Introduce a Elastic Load Balancer in front of US-EAST Web servers to allow for auto web failover
- Migrate into a VPC



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<http://flyingclusters.blogspot.com>

Continuent Website:
<http://www.continuent.com>

Tungsten Replicator 2.0:
<http://code.google.com/p/tungsten-replicator>